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PATENT
Attorney Docket No.: 015258-017610US
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Examiner S. Staicovici at Fax No.: 1 703 872-9311

On January 18, 2002

TOWNSEND and TOWNSEND and CREW LLP

By: *Lata Olivier*
Lata Olivier

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

ANDREAS WALDER

Application No.: 09/082,309

Filed: May 20, 1998

For: METHOD OF THE PRODUCTION
OF EXPANDABLE PLASTICS
GRANULATE

Examiner: Staicovici, S.

Art Unit: 1732

APPEAL BRIEF PURSUANT TO 37
C.F.R. § 1.192(a)

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Appellant hereby submits this appeal brief in triplicate pursuant to 37
C.F.R. § 1.192(a). A return receipt postcard received by Appellant indicates that the date
of receipt of Appellant's Notice of Appeal is June 18, 2001. Pursuant to 37 C.F.R.
§ 1.192(a), this appeal brief was due on August 18, 2001, extensions of time being
permitted. This appeal brief is being filed on or before January 18, 2002, and therefore, a
five month extension of time is requested. The fees for the five month extension of time
should be charged by the Commissioner to deposit account number 20-1430.

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PATENT

ANDREAS WALDER
Application No.: 09/082,309
Page 2

I. REAL PARTY IN INTEREST

The real party in interest of the subject patent application is Sulzer Chemtech AG.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences.

III. STATUS OF CLAIMS

Claims 16-26, 28 and 29 are pending. Claims 1-15 and 27 are canceled. Claims 16-26, 28 and 29 stand finally rejected. Appellant appeals from the rejection of claims 16-26, 28 and 29.

IV. STATUS OF AMENDMENTS

An amendment under 37 C.F.R. § 1.116 expedited procedure was filed on June 18, 2001 subsequent to the final rejection in the Office Action mailed December 19, 2000 ("the final Office Action"). The amendment and corresponding request for reconsideration was considered but was deemed to not place the application in condition for allowance.

V. SUMMARY OF THE INVENTION

The present invention is aimed at providing a method of economical production of expandable plastics granulate such as, for example, EPS, such that large quantities may be produced without the known disadvantages of prior art methods. Generally, according to the present invention, a plastics melt is impregnated with a fluid blowing agent that is, at elevated pressure within a given pressure region, only partially soluble in the melt.

According to the present invention, the impregnation of the plastics melt may be carried out in a single apparatus, which represents an economical advantage with respect to the prior art since a plurality of extruders would need to be used in parallel. The present invention is based upon the discovery that large quantities of expandable

PATENT

ANDREAS WALDER
Application No.: 09/082,309
Page 3

plastics granulates may be produced in an apparatus only if provisions against segregation of the melt and blowing agents are possible and are made. According to the present invention, static mixing elements act during the entire course of the process continuously on the mixture in such a way that segregation is avoided.

VI. ISSUES PRESENTED

Issues on appeal are:

Do claims 16-26 and 28-29 contain subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor(s) at the time the application was filed, had possession of the claimed invention?

Are claims 16-17, 19-23, 25 and 28 obvious in view of Buckner (U.S. Patent No. 3,751,377), in view of Muirhead et al. (U.S. Patent No. 3,372,215)?

Are claims 18 and 29 obvious in view of Buckner, Muirhead et al., and in further view of Muller et al. (U.S. Patent No. 4,314,606)?

VII. GROUPING OF CLAIMS

Appellant submits that the claims that depend on independent claim 16 recite additional features that further distinguish the claimed invention from the prior art. However, for purposes of this appeal, the claims may stand or fall on independent claim 16.

VIII. ARGUMENT

Claims 16-26 and 28-29 do not contain subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor(s) at the time the application was filed, had possession of the claimed invention. Claim 16 is the only independent claim on appeal. In the final Office Action, the Examiner states that claim 16, lines 15-17, includes the limitation of "wherein the dispensing of the blowing agent and retaining of the mixture carried out in a single apparatus in which the mixture is acted upon continuously by means of the static mixing

PATENT

ANDREAS WALDER
Application No.: 09/082,309
Page 4

elements" does not appear to have support in the original disclosure. Claims 17-26 and 28-29 stand rejected as dependent claims.

Claims 16-17, 19-23, 25 and 28 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Buckner in view of Muirhead et al. Additionally, claims 18 and 29 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Buckner in view of Muirhead et al. and in further view of Muller et al. Since claim 16 is the only independent claim on appeal and since, for purposes of this appeal, the claims may stand or fall on independent claim 16, the relevant portions of the final Office Action with regard to independent claim 16 are recited below.

With regard to the Section 112, first paragraph rejections, the Examiner stated:

In claim 16, line 1, the limitation "which does not use extruders" does not appear to be supported by the original disclosure. Specifically, on page 5, lines 25-27, the original disclosure describes a method for the production of expandable plastics granulate including "a heatable extruder ...used as a melting device".

In claim 16, lines 15-17, the limitation of "wherein the dispensing of the blowing agent and the retaining of the mixture is carried out in a single apparatus in which the mixture is acted upon continuously by means of the static mixing elements" (emphasis added) does not appear to have support in the original disclosure. Although the original disclosure does have support for "impregnation of the plastics melt... in a single apparatus" (see page 2, lines 16-17), the original disclosure does not have support for "wherein the dispensing of the blowing agent and the retaining of the mixture is carried out in a single apparatus", because on page 6, line 21 through page 7, line 6, the original disclosure describes that the step of impregnation, which includes a step of dispersion and a separate step of retention, are performed in a first static mixer (1') and respectively a second static mixer (2') different from said first static mixer (1'), hence not in a single apparatus.

PATENT

ANDREAS WALDER
Application No.: 09/082,309
Page 5

Claims 17-26 and 28-29 are rejected as dependent claims.

With regard to the Section 103 rejections, the Examiner stated:

Buckner ('377) teaches the basic claimed process including providing a source of molten resin (31), a source of volatile fluid foaming (blowing) agent (37) and a plurality of interfacial surface generators (32, 33, 34) (static mixers) (see col. 2, lines 44-46). As shown in Figure 2, the source of molten resin, extruder (31) is in operative communication with interfacial surface generator (32) (static mixer) which provides admixing of the blowing agent with the heat plastified polymer to form a gel, hence avoiding segregation (dispensing of the blowing agent and the retaining of the mixture). It should be noted that the volatile fluid foaming (blowing) agent may be added directly to the polymer source at the entry to the first interfacial surface generator (32) or may be added within the interfacial surface generator (see col. 4, lines 67-70), therefore it is submitted that the gel mixture of molten resin and blowing agent is acted upon by a plurality of interfacial surface generators (32, 33, 34) without the use of any extruders. Further, it should be noted that in addition to using extruders, alternative methods are well known in the art for providing a stream of molten polymer. Furthermore, it should be noted that since the gel mixture of molten resin and blowing agent is acted upon in a continuous manner by a plurality of interfacial surface generators, it is submitted that a single apparatus acts upon the mixture in a continuous manner. Therefore, it would have been a mere obvious matter of choice for one of ordinary skill in the art at the time of the invention to employ an alternative process to extrusion for providing a stream of molten polymer in the process of Buckner ('377), due to availability and its well known status in the art. As shown in Figure 2, the process line further includes processing units (33) and (34) to remove heat (cooling) from the heat plastified mixture and bring the material to a desired (predetermined) temperature prior to discharge from the die (35).

Regarding claim 16, Buckner ('377) does not teach granulating the cooled mixture. Muirhead et al. ('215) teach

PATENT

ANDREAS WALDER
Application No.: 09/082,309
Page 6

a process of forming expandable thermoplastic particles by extruding a heat plastified polymeric composition containing an expanding (blowing) agent in filamentary form, immediately cooling the extruded polymer and cutting the extruded and cooled polymer into particles (granules). It would have been obvious for one of ordinary skill in the art at the time of the invention to replace the die (35) in the process of Buckner ('377) with the die head (13), cooling bath (19) and cutter (20) of Muirhead et al. ('215) in order to form granulate material due to availability, process versatility and ease of processing. It should be noted that although Buckner ('377) does not directly teach "extensive shearing" while dispersing the blowing agent and "less shearing", with respect to the dispersing step, while retaining the mixture, it is notoriously well known in the art to "extensively" shear the molten resin as the blowing agent is added. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to "extensively" shear the molten resin as the blowing agent is added, hence in essence providing "less shearing", with respect to the dispersing step, while retaining the mixture, in the process of Buckner ('377) as modified by Muirhead et al. ('215), in order to uniformly distribute the blowing agent within the molten resin, due to availability and its well known status in the art. Furthermore, it should be noted that a static mixer inherently has a retention time which varies according to its size, hence the static mixer performs both mixing and retaining functions. Also, it should be note that since the volatile fluid foaming (blowing) agent may be added within the interfacial surface generator (32) (see col. 4, lines 67-70), and that a static mixer inherently has a retention time, then it is submitted that the dispensing of the blowing agent and the retaining of the mixture is carried out in a single apparatus, specifically interfacial surface generator (32).

A. The Section 112 Rejections

With regard to the Examiner's concerns pertaining to the limitation "which does not use extruders" it is respectfully submitted that the Examiner's reliance on the disclosure of "a heatable extruder ... uses a melting device" is misplaced. It is

ANDREAS WALDER
Application No.: 09/082,309
Page 7

PATENT

respectfully submitted that it is clear that the heatable extruder is disclosed as being used as a melting device and this is not subject matter of the claimed method. It is respectfully submitted that the claimed method involves a first step wherein the plastic is already molten. Hence, the subject matter recited in claim 16 is being carried out without the use of extruders and is fully supported by the specification in such a way as to enable one skilled in the art.

With regard to the Examiner's concerns pertaining to the limitation "wherein the method is carried out in a single apparatus in which the mixture is acted upon continuously by means of the static mixing elements," claim 16 is clear that it is not the entire method that is carried out in a single apparatus, but rather that it is the impregnation, which comprises only the first two steps of the method, specifically, the dispersing step and the second step of "retaining the mixture within... a predetermined retention time" that is carried out in a single apparatus.

It is respectfully submitted that at page 6-page 7 of the specification of the present application, it is stated that the two mixers are contained in a common unit 1, 2, where they are situated immediately next to each other. With this feature, it is implicitly stated that the two stages of dispersion and retention are carried out in a single apparatus. Figure 4 is compatible with this statement as it shows a single block for the unit 1, 2. It is respectfully submitted the term mixer means, in this context, a static structure that is contained in a vessel or container and that gives effect to mixing in a medium flowing through the structure within the container. It is respectfully submitted the mixer is only the mixing structure without the container. The two mixers are arranged in a common container that defines the single apparatus. When the medium flows from the first to the second mixer or mixing structure without being forced to pass through a connecting tube, a segregation of the blowing agent does not occur.

Accordingly, it is respectfully submitted that the specification does reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. Accordingly, it is respectfully submitted that the Section 112 rejections are improper.

PATENT

ANDREAS WALDER
Application No.: 09/082,309
Page 8

B. The Section 103 Rejection

To establish *prima facie* obviousness, all of the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 U.S.P.Q. 580 (CCPA 1974). M.P.E.P. §2143.03. Here, obviousness has not been established, since at least two limitations in the claims are not taught or suggested by the cited references.

It is respectfully submitted that none of the references disclose a method that does not utilize an extruder. As pointed out by the Applicant on Page 2, lines 12-26, large quantities of EPS or other comparable granulates cannot be economically produced by extruders because a plurality of extruders used in parallel would have to be used. In contrast, the present invention provides a method in which the impregnation of plastics melt may be carried out in a single apparatus thus providing an economical advantage. The present invention teaches that large quantities of expandable plastics granulate may be produced in an apparatus if provisions against segregation of the melt and blowing agent are made. Thus, the present invention utilizes static mixing elements over the course of the process in order to avoid segregation as opposed to extruders.

Buckner teaches using an extruder 31. Buckner does not disclose impregnating the plastics melt in a single apparatus. Muirhead et al. teach using an extruder 10. Muirhead et al. do not disclose impregnating the plastics melt in a single apparatus.

Accordingly, it is respectfully submitted that the Section 103 rejection is improper.

CONCLUSION

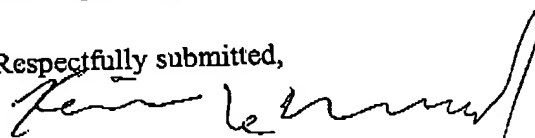
In summary, the Section 112 rejection is improper because the specification fully supports the claims and conveys to one reasonably skilled in the art

PATENT

ANDREAS WALDER
Application No.: 09/082,309
Page 9

that the inventor(s) at the time the application was filed, had possession of the claimed invention. Furthermore, the obviousness rejection is improper because at least two limitations in claim 16 are not taught or suggested by any of the cited references. Appellant respectfully requests that both rejections as to all pending claims be reversed.

Respectfully submitted,



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PATENT

ANDREAS WALDER
Application No.: 09/082,309
Page 10

APPENDIX: CLAIMS ON APPEAL

1 16. A method, which does not use extruders, for the production of
2 expandable plastics granulate from a plastics melt and a fluid blowing agent that is, when
3 at a pressure within a predetermined pressure range, only partly soluble in the melt, the
4 method comprising the steps of:
5 dispersing the blowing agent in the melt with shearing of the melt thereby
6 creating a mixture;
7 retaining the mixture within a predetermined pressure range for a
8 predetermined retention time;
9 subjecting the mixture to less shearing, with respect to the shearing during
10 the dispersing step, during the predetermined retention time;
11 cooling the mixture to a temperature that is above the solidification
12 temperature of the melt;
13 granulating the cooled mixture; and
14 acting on the mixture with static mixer elements; and
15 wherein the dispensing of the blowing agent and the retaining of the
16 mixture is carried out in a single apparatus in which the mixture is acted upon
17 continuously by means of the static mixing elements as the mixture moves through the
18 apparatus for avoiding segregation.

1 17. The method of claim 16 wherein the cooling is performed at least
2 partly by components that also act on the mixture for static mixing.

1 18. The method of claim 17 wherein the cooling is performed in a static mixer
2 having elements crossing each other and formed as heat exchanging pipes.

1 20. The method of claim 19 wherein the chilling is performed with water.

1 21. The method of claim 19 further comprising forming the formed
2 strands into granules by disintegration.

PATENT

ANDREAS WALDER
Application No.: 09/082,309
Page 11

- 1 22. The method of claim 16 further comprising adding at least one additive to the
2 melt.
- 1 23. The method of claim 16 wherein a pressure drop during the dispersing step is
2 larger than a pressure drop during the retaining step.
- 1 24. The method of claim 23 further comprising increasing the pressure which the
2 melt is subjected to in-between the dispersing step and the retaining step.
- 1 25. The method of claim 16 wherein a pressure drop during the cooling step is
2 larger than a pressure drop during the retaining step.
- 1 26. The method of claim 25 further comprising increasing the pressure which the
2 melt is subjected to in-between the retaining step and the cooling step.
- 1 27. Canceled.
- 1 28. The method of claim 16 wherein the dispersing step is performed in a
2 first static mixer and the retaining step is performed in a second static mixer.
- 1 29. The method of claim 28 further comprising pumping the mixture into
2 a third static mixer having elements crossing each other and formed as heat exchanging
3 pipes for performing the cooling step.

SF 1304883 v1